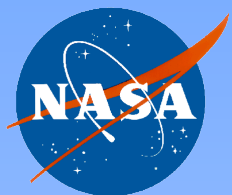


ATMOSPHERIC INFRARED SOUNDER

PROJECT STATUS

September 30, 2003

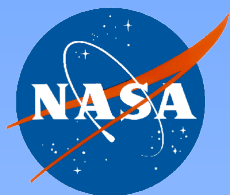
**Presented by T. Pagano
California Institute of Technology
Jet Propulsion Laboratory**



AIRS/AMSU/HSB Objectives



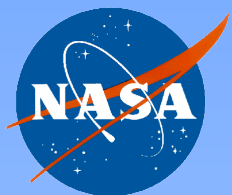
- **Demonstrate Technology**
- **Demonstrate Basic Algorithms (L0, L1, L2)**
- **Provide Data Products to Weather Centers**
 - *Near Real-Time Distribution for assimilation into forecast models*
- **Answer Key Science Questions**
 - ***The global water and energy cycle:** Is the cycle of evaporation and precipitation on Earth accelerating?*
 - ***Determine the distribution and variations of water vapor** - Earth's primary greenhouse gas*
 - ***Climate weather connection:** Are current weather anomalies (hurricanes, droughts) connected to climate change and how?*
 - ***Trace Gasses:** Will develop global map of the distribution of atmospheric concentration of CO₂*



AIRS/AMSU/HSB DATA PRODUCTS



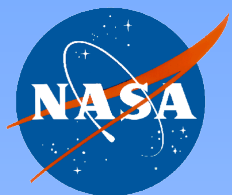
<u>Radiance Products (Level 1B)</u>	RMS Uncertainty*	Horizontal Resolution	
AIRS IR Radiance	3%	15 x 15 km	
AIRS VIS/NIR Radiance	20%	2.3 x 2.3 km	
AMSU Radiance	0.25-1.2 K	45 x 45 km	
HSB Radiance	1.0-1.2 K	15 x 15 km	
<u>Standard Core Products (Level 2)</u>			
Cloud Cleared IR Radiance	1.0K	45 x 45 km	Vertical Resolution
Sea Surface Temperature	0.5K	45 x 45 km	
Land Surface Temperature	1.0K	45 x 45 km	1 km below 700 mb 2 km 700-30 mb
Temperature Profile	1K	45 x 45 km	
Humidity Profile	15%	45 x 45 km	2 km in troposphere
Total Precipitable Water	5%	45 x 45 km	
Fractional Cloud Cover	5%	45 x 45 km	
Cloud Top Height	0.5 km	45 x 45 km	
Cloud Top Temperature	1.0 K	45 x 45 km	



AIRS Team Accomplishments



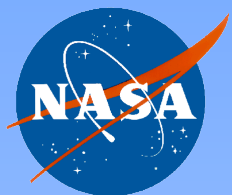
- **Congratulations! All first year milestones satisfied**
 - *Activation and Evaluation of AIRS/AMSU/HSB*
 - *Delivery of Level 1B to NOAA and the GSFC DAAC*
 - *NOAA delivers AIRS Data to the International Weather Centers*
 - *Level 2 Meets 1K/km Temperature Requirements*
 - *Level 2 Delivered to the GSFC GMAO (Assimilation Office) for impact assessment*
 - *Level 2 Delivered to the GSFC DAAC*
 - *User Guide and Validation Report Delivered*
 - *Level 2 Available to the Public at the GSFC DAAC*
 - *Level 2 Available to NOAA. Distribution to NWP centers shortly*
- **Next: Exploration. New Territory.**



JPL DEVELOPS “FOCUS GROUPS” TO FACILITATE PROJECT PRIORITIES



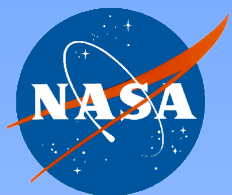
- Instrument Operations and Calibration D. Elliot
- Level 2 Product Maintenance and Upgrade S.Y. Lee
- Level 3 Product Development S. Granger
- Product Validation E. Fetzer
- Software Development, Computing and Archive Friedman S.
- Science and Climate Research B. Lambrigtsen
- User Services E. Olsen
- Education and Public Outreach S. Okonek
- Project Priorities Defined for Each Focus Group



Instrument Operations and Calibration



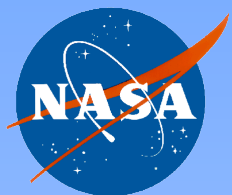
- **Continue Operations, Extend Mission Life**
 - *Routine Operations, Telemetry Trending*
 - *Early Anomaly Detection*
 - *Spacecraft Designed for 6 years, Expect 7-9*
 - *AIRS Design Life is 5 years, Expect 7*
 - *AMSU Design Life is 3 years, Longest is 5.5y and going*
- **Improve accuracy of raw sensor radiances**
 - *As level 2 products mature more emphasis will be on improving level 1 products accuracy*
 - *Spatial effects may become more important, particularly over land*
 - *Noise effects (striping, correlated noise, etc.) may limit ultimate sensitivity of retrievals*



Level 2 Product Maintenance and Upgrade



- **Satisfy Weather Forecast Prediction Centers (Short Term)**
 - *Infrequent errant data points (outliers) significantly mitigate forecast improvement*
 - *Investigate ways to identify outliers using internal indicators*
- **Make AIRS Data More Accurate (Longer Term)**
 - *Improve water vapor spectroscopy*
 - *Improve boundary layer accuracy*
 - *Improve surface accuracy (emissivity and temperature)*
 - *Improve cloud clearing*
 - *Address ocean first, then land*



Level 3 Product Development



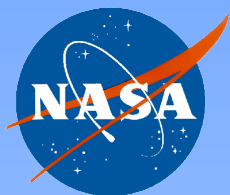
- **Make AIRS Data Easier to Use**

- Near Term**

- *Develop standard TOVS based gridded data sets*
 - *Clear-only footprint subsetting*
 - *Work with scientists to define requirements for more advanced needs*

- Longer Term**

- *Principal Component Files*
 - *Statistics Files*



AIRS VALIDATION TIMELINE

Next up: Nonpolar night land

- **Validate AIRS Data Products**



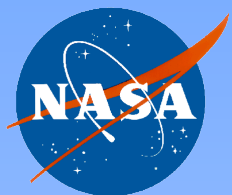
	Version	3.0	4.0	5.0	6.0	7.0	8.0
	Activation Date	7/1/03	9/17/04	6/24/05	3/24/06	12/15/06	9/21/07
Radiance Products (L1)		8/15/03					
	AIRS Radiance	Prov	Val2	Val4	Val5		
	VIS/NIR Radiance	Prov	Val2	Val4	Val5		
	AMSU Radiance	Beta	Prov	Val2	Val4	Val5	
	HSB Radiance	Beta	Prov	Val2	Val4	Val5	
Standard Products(L2)							
	CloudCleared IR Radiance	Beta	Val2	Val3	Val4	Val5	
	Surface Temperature	Beta	Val2	Val3	Val4	Val6	
	Temperature Profile	Beta Prov	Val2	Val3	Va4	Val5	
	Humidity Products	Beta	Val1	Val 2	Val3	Val4	Val5
	Cloud Cover Products	N	Beta	Val1	Val2	Val2	Val3

Beta = Not suitable for scientific investigations. Consult with AIRS Project on regional status.

Prov = Provisionally validated. Useable for scientific investigations with caution. Validated for nonpolar night ocean only

Val1 = nonpolar day/night ocean.
 Val2 = Val1 + nonpolar night land.
 Val3 = Val2 + nonpolar day land
 Val4 = Val3 + polar night
 Val 5= Val 4 + polar day .

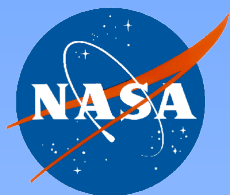
Validation Report Accompanies Every Delivery



Software Development, Computing and Archive



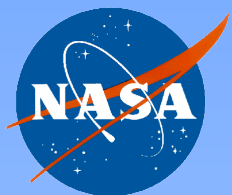
- **Deliver our Standard Data Products**
 - *NOAA: Planned interim delivery in TBD '04.*
 - *L2 Direct Broadcast Expected in TBD '04*
 - *Meet next major PGE delivery in 9/04*
 - *Provide Computing Resources*
 - Unified Team Algorithm Software Integration
 - Testing, Archiving, Routine Processing Operations, Matchup
- **Develop User Friendly Tools**
 - *Work with L2 and L3 teams to develop tools to make our products easier to use*



Science and Climate Research



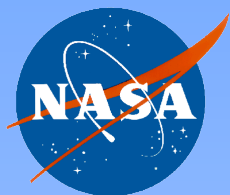
- **Create Stable Climate Data Records**
 - *Draw upon internal expertise to address climate questions and create products*
 - *Help define the data products needed to facilitate studies of climate research by the community*
- **Identify Applications for AIRS Data**
 - *What weather questions can be answered*
 - *What visualizations are required*
- **Participate in Interdisciplinary Science**
 - *AIRS data useful for hydrological cycle, energy cycle, and carbon cycle*
 - *Coordinate with other instrument science teams*
 - Multi-Sensor Products, Validation



User Services



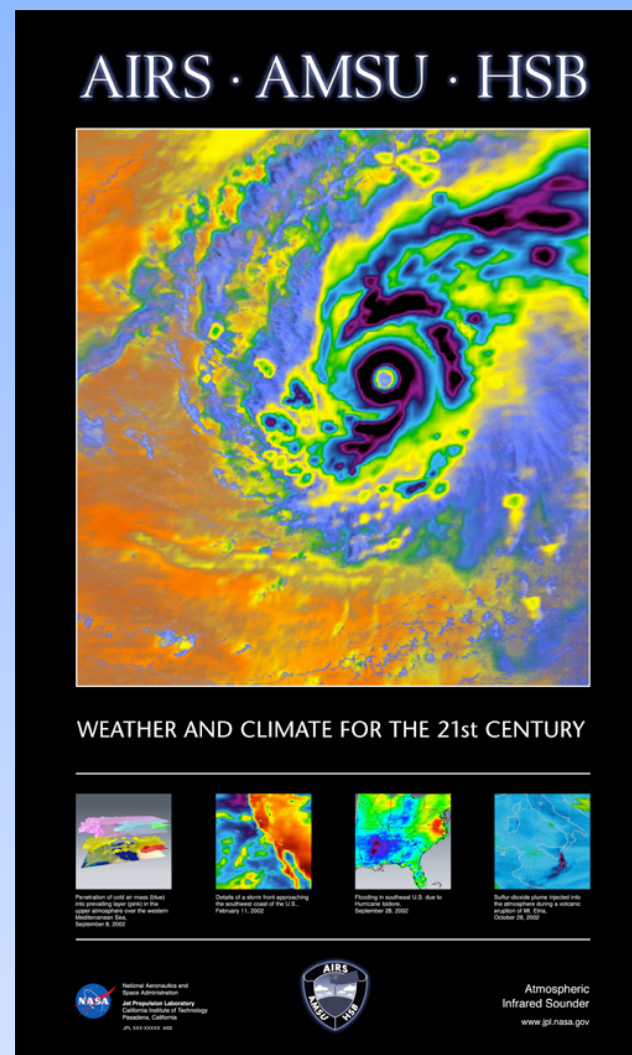
- **Make AIRS Data more accessible**
 - ***Science Team Support***
 - Focus Day Processing
 - Special Processing and Data Requests
 - ***External Science Team Requirements***
 - Readers
 - Documentation (User Guide)
 - ***To the public***
 - Hurricane Visualizations
 - ***Solicit Feedback from Users***
 - Web Surveys, Web FAQ
 - ***Participate In/ Host User Workshops***

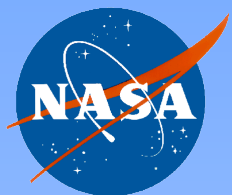


Education and Public Outreach



- **Engage the Public/Education**
 - *To inspire future generations...*
 - *NASA Vision*
 - *Good press for the project helps NASA get support for the current activities and future efforts*
 - *Support our Schools*
 - *Participate in Conferences*
 - *Support media*
 - *Press Releases*
 - *Poster*
 - *T-Shirts*

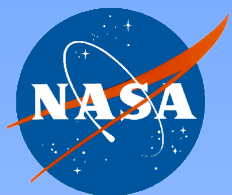




FY'04 Release Characterization



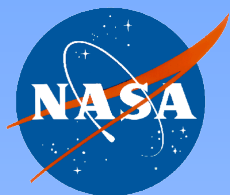
- **V3.5 – Internal Quality Indicators**
 - *Improved AIRS Project derived Level 2 quality indicators to support data assimilators*
- **V3.7 – Benchmark Assessment of V4.0**
 - *Preliminary first release software (e.g., Level 3)*
 - *Any software that will affect down-stream Level 1 or 2 processes*
 - *Any code that is ready to go*
- **V4.0 – Next Public Release**
 - *Improved Level 2 products*
 - *Validation region extended latitudinally, over land*
 - *First release of any Level 3 products*



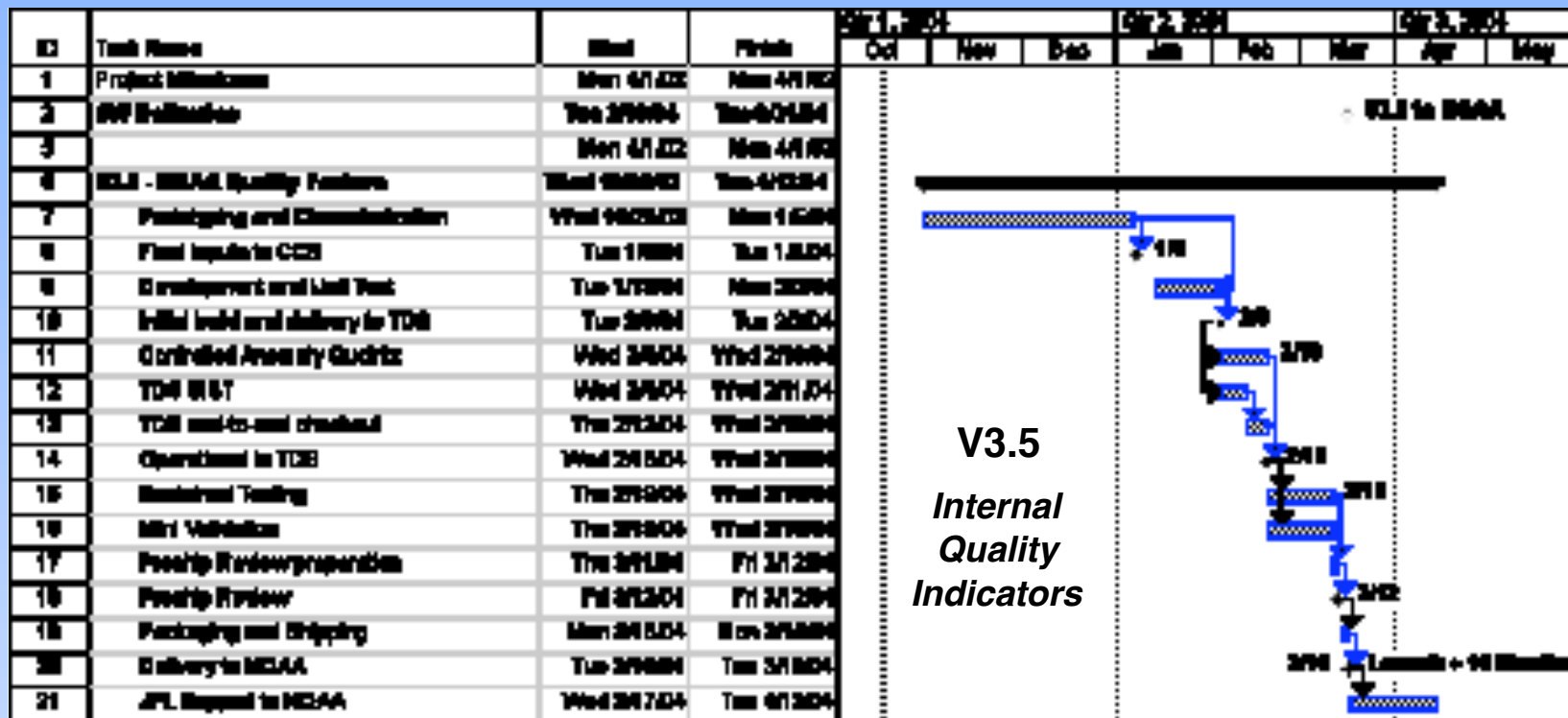
FY'04 Schedule Highlights

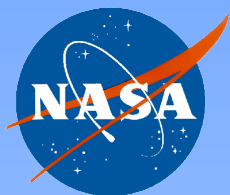


	Release Emphasis	Prototyping Ends	Development Ends	System Stabilized	Version Complete
V3.5	Internal Quality Indicators	01/06/04	02/02/04	02/18/04	03/12/04
V3.7	V4.0 Benchmark	03/01/04	03/29/04	04/13/04	05/04/02
V4.0	Public Release	05/28/04	07/02/04	08/03/04	08/31/03

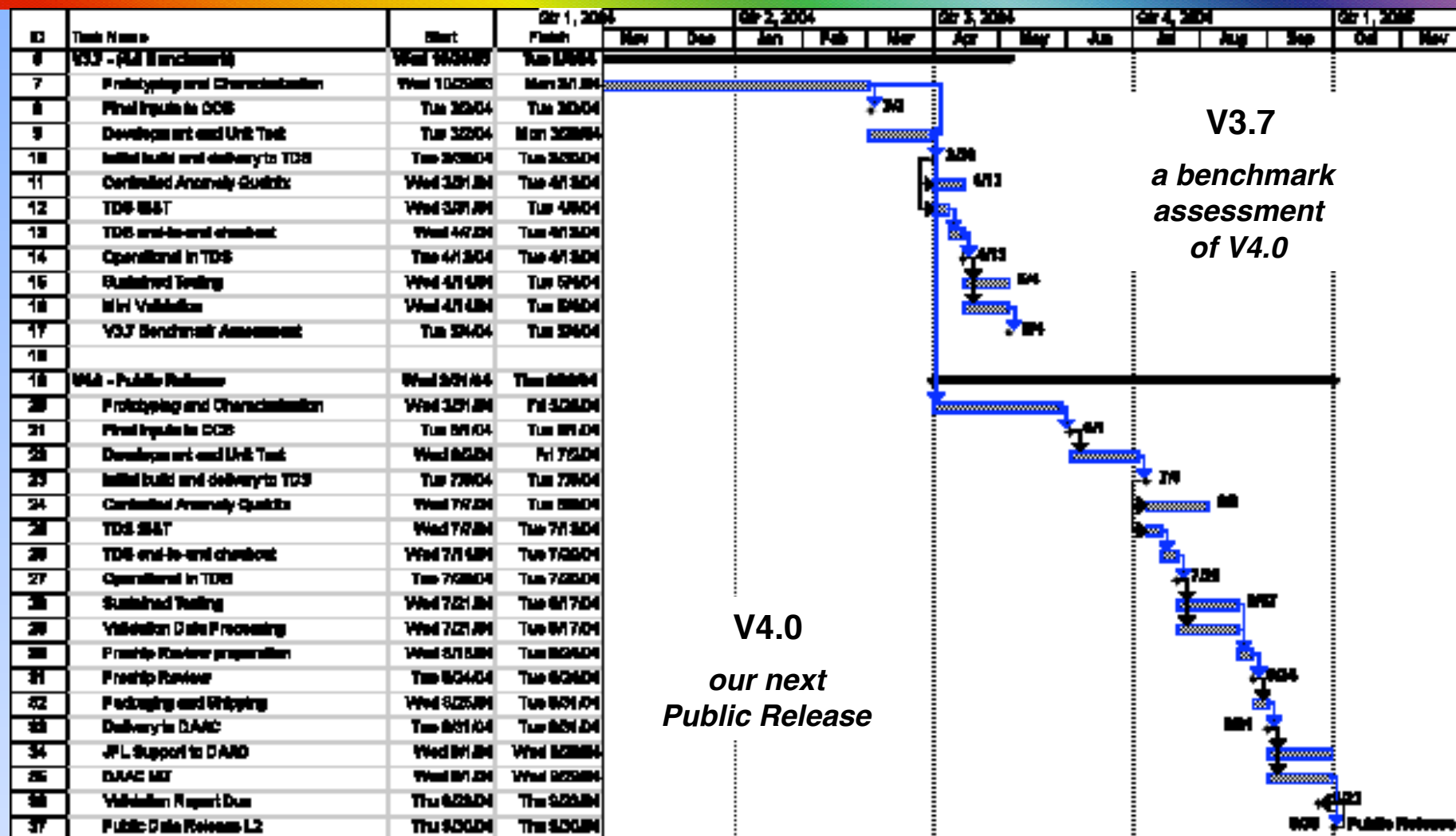


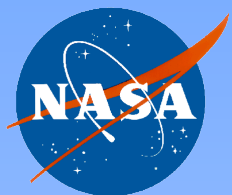
V3.5 Release





V4.0 Release Track





SUMMARY AND CONCLUSIONS



- **It was an excellent first year! All 1st year milestones achieved.**
- **AIRS Priorities Identified for the coming year**
- **Priorities define our objectives and create a roadmap for the coming year's tasks**
- **Focus Groups help coordinate tasks to meet project priorities and objectives**
- **JPL to work closely with Science Team to Meet Objectives**
- **Delivery timeline established for NOAA and Public Release of Next Version**
- **www.jpl.nasa.gov/airs**